

XV.—*Contributions towards a General History of the Marine Polyzoa.* By the Rev. THOMAS HINCKS, B.A., F.R.S.

[Continued from vol. vi. p. 384.]

[Plates VIII., IX., & X.]

IV. FOREIGN MEMBRANIPORINA (second series).

a. With a membranous front wall.

*Membranipora coronata*, n. sp.

(Pl. X. fig. 1.)

*Zoæcia* lozenge-shaped, contiguous; area occupying the whole front, with a membranous covering; margin not much elevated, except round the oral extremity, where it rises into a hood-like screen, projecting slightly over the area and hollowed out in front into an arch; inner surface of the cell-wall very strongly crenated and granulated; immediately above each zoecium an immersed *avicularium* with acute mandible, placed transversely. *Oæcium* (?). *Zoarium* white and shining.

*Loc.* Singapore or the Philippines, on coral (*Miss Jelly*).

The striking features of this pretty species are the crowning *avicularium*, the very marked crenation of the border of the cells, and the glossy whiteness of the whole zoarium.

*Membranipora terrifica*, n. sp.

(Pl. VIII. fig. 5.)

*Zoæcia* large, somewhat pyriform, arched above, widest in the middle, narrowing off below the area; area broad below, slightly contracted towards the top, with a membranous covering, occupying about two thirds of the front of the cell; margin not much elevated, thin, smooth; the wall of the cell below the area dense, uneven, punctured; placed transversely along the whole of the lower margin of the aperture, and projecting prominently on the subjacent space, a gigantic *avicularium*, with long, narrow, curved beak, the basal portion much expanded, with an angular projection on each side in the line of the hinge; mandible (probably) slender and setiform.

*Loc.* Straits of Magellan, on *Eschara flabellaris*, Busk (*Miss Gatty*).

*Membranipora rubida*, n. sp.

(Pl. VIII. fig. 6.)

*Zoæcia* somewhat pyriform, arched and expanded above, below the area narrowing rather abruptly downwards; area

suborbicular, the covering wholly membranous, occupying about three fourths of the front of the cell; margin much raised round the sides and upper portion of the cell, thin, smooth, two spines on each side of the orifice, the foremost pair very tall and stout; zoecium prolonged slightly below the area, and on this portion is situated an *avicularium* borne on the summit of a stout and rather tall peduncle, from the lower part of which two spines often project, mandible acute, directed downwards; sometimes replaced by a linguiform avicularium, slightly pedunculate, placed transversely. *Zoarium* of a reddish-brown colour.

*Loc.* Australia, on stone (*Miss Gatty*).

The prolongation of the cell below the area is often small and inconspicuous; but its position is indicated by the stalked avicularium which is always placed upon it. The peduncle of this appendage, which is of remarkable length, seems to consist of two parts—a short tubular base, which frequently bears two spinous processes, and is permanently attached to the cell, and a much longer cylindrical stem, on which the avicularium is supported; the latter is easily detached, and seems to be jointed in some way or other to the fixed basal portion. The structure is interesting, as showing a modification in the direction of the higher articulate forms.

*Membranipora bicolor*, n. sp.  
(Pl. IX. fig. 1.)

*Zoecia* oblong, narrow, alternate, very regularly disposed in lines, the whole front filled in by a membranous wall, at the very top of which is the opercular valve; margin thin and smooth; the zoecia in each line separated by elongate spaces, usually rather less than the cell in length, which are covered in by a white calcareous roofing, terminating at one extremity in an arch, with a somewhat thickened rim, which incloses the orifice of the cell below, and at the other more or less hollowed out, the depression extending to the base of the cell above. No spines or *avicularia*.

*Loc.* West Australia, spreading over weed (*Miss Jelly*).

The elongate calcareous boxes interposed between the cells in this species might naturally be taken for oecia; but they are closed in at the end by a calcareous wall, in which there seems to be no opening beyond some minute perforations. They have probably, therefore, some other significance; but what it may be I am unable at present to determine. The zoecia are really of a slender, elongate-oval shape, though they sometimes appear quadrangular. The membranous front wall extends to the top of the hollow or depression in

the neighbouring interspace, and lies quite on a level with the rim of the margins.

*Membranipora bellula*, n. sp.  
(Pl. VIII. figs. 4, 4a, 4b.)

*Zoæcia* pyriform, rounded and expanded above, and narrowing off to the base; area occupying about half the length of the cell, wholly filled in with membrane, subelliptical, broad below and narrowing very slightly upwards to the top, where the semicircular orifice is placed, flanked on each side by two tall erect spines; on the lower margin a single, much-branched spine, which spreads over the aperture, forming an antler-like operculum; sometimes a very long corneous spine, springing from a raised socket, a little below the inferior margin; portion of the cell below the area, which is sometimes a good deal elongated, smooth and shining, and covered with numerous delicate spinules. *Oæcia* none.

Var. *a* (*bicornis*). With two opercular spines on the lower margin, of small size and slightly branched, placed one on each side of a short, sharply pointed central mucro rising from a prominent boss; a single spine only on each side of the orifice; no spinules or horny appendages; surface smooth, white, and very polished.

Var. *β* (*multicornis*). Opercular spines 3-5, placed closely together, their numerous dichotomous branchlets combining to form a beautiful protective shield, which extends to the base of the oral valve.

*Loc.* Australia, normal and var. *multicornis*; Ceylon, var. *bicornis*; Madagascar (*Miss Jelly*); St. Vincent, Cape-Verd Islands (*Miss Gatty*). *M. bellula* always occurs creeping over weed, and frequently runs out into narrow strap-like segments.

This is an exquisite species, which seems to be far from uncommon in various parts of the world; and it is difficult to understand how it is that it has remained so long undescribed. I cannot recollect, however, to have met with any published account of it, although it has been known to collectors under a manuscript name. It is a species which varies much in appearance, the changes being chiefly due to the presence or absence of the spinous appendages, and especially to the modification of the opercular spine. The principal varieties have already been noticed. In some cases the tall corneous spine rising from a distinct socket, which is so characteristic of *M. pilosa* (from which the present form is probably derived), makes its appearance; in others the zoarium bristles with immense numbers of slender spinules; in others, again, it has

neither seta nor spinule. In a curious form from Madagascar the edges of the narrow segments into which the zoarium divides are fringed by very tall and slender setæ, frequently placed in pairs, whilst there is also a profusion of the suboral appendages. This form presents a very marked contrast to the extremely simple and elegant variety (*bicornis*) from Ceylon. The same variability in the spinous armature is characteristic of *M. pilosa*.

b. With a calcareous lamina.

*Membranipora patula*, n. sp.  
(Pl. IX. fig. 4.)

*Zoæcia* short, narrowed above and broadly expanded below, the upper extremity of the cell much raised, the lower depressed; margin well raised, narrow, sharp, minutely granulated; aperture arched above, the lower margin slightly curved outwards, occupying fully three fourths of the length of the area, the lower fourth filled in by a strongly granulated, calcareous lamina, which is continued for a short distance up each side; on the upper margin four very stout cylindrical spines, two towards each side, which are articulated by corneous joints; projecting from the centre of the back of the cell, some way below the margin, an *avicularium* with pointed mandible, directed straight outwards. *Oæcium* (?).

*Loc.* California (*Miss Jelly*).

*Membranipora setigera*, n. sp.  
(Pl. VIII. fig. 3.)

*Zoæcia* large, ovate; area occupying the whole front of the cell, the lower two thirds covered in by a shining calcareous lamina, minutely pitted over; aperture arched above, lower margin straight, closed by a rather stout membranous wall, at the upper extremity of which is the orifice; margin not much raised, granulated; a row of 6-8 tall spines surrounding the upper extremity of the area. *Avicularia* none. *Oæcium* (?).

*Loc.* Australia, investing *Serpula* (*Miss Gatty*).

This species belongs to the same section of the genus as our British *M. Rosselii* and *M. trifolium*. Its spines are a conspicuous character, the zoarium literally bristling with them. The surface is flat and somewhat glistening.

*Membranipora spinosa*, Quoy & Gaimard.

*Flustra spinosa*, Q. & G., Voy. de l'Astrolabe.

*Membranipora ciliata*, MacGillivray, Trans. Roy. Soc. Victoria, 1868.

*Membranipora spinosa*, Busk, Polyzoa of Kerguelen Island.

Busk identifies a form from Kerguelen Island with the

*Flustra spinosa* of Quoy & Gaimard; and from the figure which he gives it would seem to be the same as the *M. ciliata* of MacGillivray, an Australian species. If he is correct in his identification, the latter name must give place to that of Quoy and Gaimard.

The species has occurred in the following localities:—Kerguelen Island (*Mr. Eaton*); Australia (*MacGillivray*); Arabian Sea, between Bombay and Aden, lat. about  $15^{\circ}$  N., long. about  $65^{\circ}$  E. (*W. Oates*).

Another *Membranipora spinosa* has been described by D'Orbigny (*Voy. dans l'Amér. Mérid. vol. v. 4<sup>e</sup> partie*), which bears a close resemblance to *M. spinifera*, Johnston, but is apparently destitute of avicularia. It is furnished with about 10 spines on each side of the cell.

*Membranipora permunita*, n. sp.  
(Pl. X. fig. 2.)

*Zoæcia* arched above, expanding very slightly towards the centre, and then narrowing off more or less to the base, which is subtruncate; area occupying the whole of the front of the cell, the lower two thirds filled in by a strong, thickly-granulated, calcareous lamina; aperture arched above, lower margin straight, higher than broad, margin scarcely elevated, very finely beaded; scattered amongst the zoæcia elongate, narrow-oval cells, the lower part of which is occupied by an *avicularium*, depressed at the base, the beak much raised, turned obliquely to one side, somewhat curved and pointed; mandible slender, edged on each side by a horny expansion; upper portion of avicularian cell hollow and open. *Oæcia* rounded, closely united to the lamina of the cell above, with a raised rib round the front, inclosing a minutely granulated space.

*Loc.* Off Curtis Island, Bass's Straits, common on shell (*Capt. W. H. Cawne Warren*).

This species occurs in a very interesting collection of Polyzoa made by Capt. Warren, of the ship 'Bedfordshire,' and presented by him to the Liverpool Free Museum. The committee of the Museum, at the instance of its very able and energetic curator, Mr. Moore, have entrusted the collection to me for examination; and I hope to describe and figure a number of new forms from it in subsequent papers.

*M. permunita* is interesting as being one of the few recent species belonging to the present section of the genus which are furnished with an avicularium of the elongate type placed on a well-developed cell-area. A very similar appendage



occurs on *M. curvirostris*, mihi; and it is not uncommon amongst the species with a membranous front wall.

*Membranipora (Caleschara) denticulata*, MacGillivray\*.  
(Pl. VIII. fig. 2.)

*Zoarium* foliaceous, with the cells in two layers placed back to back, or incrusting. *Zoecia* arched above, widening about the middle, and contracted below; margin smooth, sometimes traversed by a brown line, inner side of the cell-wall granular; area occupying the whole front of the cell, the lower one third filled in by a granulated calcareous plate; a transparent membranous wall extending over the entire area, including the calcareous plate, the oral valve being placed at the very top of it; from the centre of the upper edge of the lamina rises a broad calcareous process (also granulated), which extends to about one third the length of the aperture from the top, where it sends off two lateral branches to the wall of the cell, forming in this way a foramen on each side, the inner edges of which are denticulate; the upper margin of the process is slightly thickened, and shuts off a semicircular space above, corresponding with the operculum in the true front wall; at the bottom of each cell one or sometimes two rather large smooth nodules. *Oecium* wide, little projecting, incorporated with the cell above, both the ovicelliferous cell and the one above it of unusual size (*MacG.*).

*Loc.* Victoria (*MacGillivray*): off Curtis Island, Bass's Straits, on shell, forming a brown subcircular patch (*Capt. Cawne Warren*).

MacGillivray places this species among the Escharidæ (Busk), simply, it would seem, on the ground of its erect habit. It has, in truth, no real affinity with this family as constituted by Busk. The depressed area, the elevated margins, and the membranous front wall show that its place is amongst the Membraniporidæ. Nor is there any sufficient ground, in my judgment, for referring it to a new genus. The peculiarity on which MacGillivray founds his *Caleschara* ("front calcareous, except a small part anteriorly, which is membranous") is, I believe, quite insignificant. I venture to think that he has misinterpreted the structure of the zoecium, probably owing to the imperfect condition of the specimens which came under his notice. The "front" of his description is not the true front wall of the cell, but merely a calcareous upgrowth from the edge of the lamina (strictly

\* 'Prodromus of the Zoology of Victoria,' decade v., by Fred. M'Coy, F.R.S.; 'Polyzoa,' by P. H. MacGillivray, p. 45, pl. xlviii. fig. 8.

comparable with the "serrated denticle," similarly placed in *Membranipora* (*Biflustra*) *delicatula*, Busk); and the membranous portion at the upper extremity is only occasional, and merely denotes imperfect development. That *the true upper wall of the zoæcium* is the membrane which closes in the whole of the area is evident from the course of development and from the fact that it bears the oral valve. In the younger zoæcia the laminar process is either wholly wanting or very imperfectly developed, whilst the membranous wall, furnished with the semicircular orifice for the egress of the polypide, occupies the whole of the opening *at a considerable distance above the lamina*.

The real peculiarity of this form is that the membrane incloses the granular plate and its process; but this, however curious, is hardly a generic character. The same thing occurs in a less degree in *M. nitens*, mihi. As to the habit of growth, MacGillivray's figure represents a small erect and foliated specimen; the one from Bass's Straits is wholly crustaceous. Another which I have examined grows round a stem of seaweed, and the free edges meeting on one side of it come together and unite; and in any further growth at this point there would be a bilaminar structure, and the zoarium would become erect and detached; but it would be none the less a *Membranipora*. The large nodules at the base of the cells, which were present in the specimen I have figured, materially change the general appearance of the species.

*Membranipora cervicornis*, Busk\*.  
(Pl. VIII. fig. 1, and Pl. X. fig. 3.)

*Zoæcia* oval; margin much raised round the upper part of the cell, forming a very thin wall, which also extends for some distance down the sides; area occupying the whole of the front, about a third of it filled in by a smooth and shining calcareous lamina, which is carried up for some distance on

\* There has been some doubt whether the *M. cervicornis*, Busk (Cat. pt. 1, pl. c. fig. 3), is identical with the form described by MacGillivray under this name. Busk's figure does not show the detail of the zoæcium very clearly; but the branching spines, as he represents them, are certainly different from the similar appendages as given by MacGillivray. They are massive and spreading, and bend in over the area, the branches "meeting and inosculating;" whereas in the other form they are erect and comparatively slender, and show no tendency to unite across the cell. The colour also of Busk's species is said to be "purplish;" that of the Australian species white or brownish. Amongst Capt. Warren's dredgings, however, from Bass's Straits, I have met with specimens undoubtedly referable to MacGillivray's species, in which the spines are somewhat more massive, and occasionally meet and (apparently) unite across the cell; they are also of a deep purplish colour.

each side; aperture flattened above, narrowing downward, rounded at the lower extremity (very much in the form of a heraldic shield), surrounded by a slightly thickened rim; at the top of the cell four spines, placed two on each side, the foremost pair stout, suberect, and branched, like a stag's horn, the upper tall, slender, and slightly forked; between them a raised *avicularium* with pointed mandible, placed transversely on the margin of the cell, or projecting straight outwards from the back; frequently a large raised *avicularium* at the bottom of the cell. *Oœcium* very shallow, galeriform, smooth, the oral surface much sloped, so as to expose the opening; a raised line arching across the front a short distance above the opening, inclosing a narrow subhyaline belt; an *avicularium* on the summit, placed transversely; two spines in front of the ovicell, and two at the sides (Plate VIII. fig. 1). *Zoarium* white or brownish, or of a rather deep purplish colour.

Var. *a*. *Oœcium* much deeper (less shallow), almost subquadrate, the oral surface not sloped; a raised rib in front inclosing a subtriangular space; one or two *avicularia* at the back (Pl. X. fig. 3).

*Loc.* Victoria (*MacGillivray*); var. *a*, off Curtis Island, Bass's Straits (*Capt. Cawne Warren*).

I have thought it desirable to give a detailed description of this species, as MacGillivray has contented himself with a very brief diagnosis. Busk's account of his *M. cervicornis* is almost equally brief; and between the two there is some difficulty in deciding with any certainty as to the identity or otherwise of the two forms.

The differences in the oœcium are striking and curious; but they can only be regarded as varietal. The spines are articulated to a fixed tubular base, and are easily detached; in their absence it is somewhat difficult at first sight to recognize the species.

#### Note on *Membranipora transversa*, Hincks.

When I described this form ('Annals,' July 1880) I was not aware that Mr. Hutton had been before me. I had not then seen his paper in the 'Proceedings of the Royal Society of Tasmania' for 1877 (published in 1878), in which he has characterized it as *M. cincta*. Of course the name *transversa* must be cancelled; and I can only hope that it may drop out of sight and give no further trouble.

In a paper presented to the Royal Society of Victoria early in 1880 Mr. MacGillivray has given a fuller account of the same species, and proposes to refer it to a new genus, which he names *Diplopora*, and of which the distinctive characters



seem to be that the zoecium is divided into two parts, and that "a narrow transverse portion" of the front cell-wall, "a little distance behind the mouth and in front of the elevated part," is deficient in calcareous matter and entirely membranous. On reexamining my specimens I find that a membranous wall closes in the whole of the aperture, bearing the oral valve at the upper extremity, and extending almost to the top of the elevated portion of the cell. Beneath the oral valve is an elliptical orifice with calcareous margin filled in with membrane and having a circular opening in the centre; from the edge of this inner orifice a calcareous wall passes down to a fissure extending transversely across the cell, and probably marking the termination of the true zoecium. Below the fissure is the wall of the elevated part of the cell, which is a strong box. Towards the base of this wall a tubular process projects into the fissure, probably forming a communication between the box and it. The precise significance of this structure can only be determined by an examination of living specimens; but it seems to form a good basis for a new generic group.

One curious peculiarity of this species should be noted. The colonies, which always seem to encircle the stems of certain algæ, commence with a (transverse) row of elongated, narrow, quadrangular cells, having the front entirely closed in with membrane, destitute of orifice, and of all the characteristic structure of the adult; this row is followed by a second, in which the cells resemble generally those in the first, but are much shorter; and from these the normal zoecia originate.

### Family Microporidæ.

Genus VINCULARIA (part), Defrance.

*Vincularia abyssicola*, Smitt.  
(Pl. X. fig. 4.)

This form I had figured from a specimen incrusting a small fragment of coral, as (probably) a new species of *Setosella*; and only ascertained subsequently that it was identical with *Vincularia abyssicola* of Smitt. I mention this to show how essentially Membraniporidan the zoecial character of this generic type is; in its incrusting state it is impossible to distinguish the present species from *Setosella*. Whether its peculiar habit of growth in the adult state (the zoecia are arranged so as to form erect, cylindrical stems like those of *Cellaria*, but unjointed) entitles it to generic rank is a question to which different answers may be given; but we indicate

its true natural affinities (and this is the important point) by ranking it in the family of the Microporidæ.

*Vincularia ornata*, Busk, and *V. neozelanica*, Busk, are true Membraniporidæ.

I have engraved the figure of *V. abyssicola*, as it shows a finer development of the remarkable vibracula than Smitt's. These appendages exhibit a very interesting structure, being edged for a considerable portion of their length along both sides by a rather broad membranous expansion.

*Loc.* Off Cojima, Cuba, 450 fathoms, on *Retepora*; Florida, 68 fathoms, on *Nullipora* (Pourtales); on coral from Singapore or the Philippines (*Miss Jelly*).

## V. FOREIGN CHEILOSTOMATA. (Miscellaneous.)

### Family Epicaulidiidæ.

#### EPICAULIDIUM, n. gen.

*Gen. char.*—*Zoarium* calcareous, composed of a creeping base and erect stems, made up of internodes linked together at their extremities by corneous joints, on which the zoœcia are borne in companies. *Zoœcia* erect, clavate, with a small, oblique, subterminal orifice, several united together longitudinally, so as to form a cluster; the clusters opposite, free, except at the base, where they are attached by corneous joints to the internodes.

#### *Epicaulidium pulchrum*, n. sp. (Pl. X. fig. 5.)

*Stem* composed of jointed internodes of about equal length, which are white, expanding gradually from the base upwards to a point a short distance below the top, where there is a slight protuberance on each side, surmounted by a circular orifice, from which the corneous joint supporting the cluster of cells originates; above the projections the internode narrows and continues cylindrical to the top; a number of small tubules immersed in the cells, which show as disks on the surface and give it a speckled appearance; no branching. *Zoœcia* in triplets, united through their whole length, the central one compressed, narrow, pointed below, slightly wider above, orifice oval, oblique, with a thin slightly raised margin, facing towards the base of the stem (downwards); two lateral cells subclavate, expanded above, narrowed and pointed at the base, orifice as in central cell, except that there is a small spine in the centre of the upper margin; surface smooth and shining; the lateral cells attached by the dorsal surface to the sides of the central, orifice facing sideways, with a slight

turn upwards; the triplets also speckled, but less strongly and constantly than the stem; form of the triplets subcordate. *Oæcia* (?).

*Loc.* Jamaica, creeping over an alga (*Miss Jelly*).

Amongst the taller stems occur others consisting of a very short and slender internode attached by a corneous joint to the creeping base, and bearing on its summit a single triplet. In these cases growth seems to proceed no further. The *primary internode* of the ordinary stem is jointed to the creeping fibre, and is sometimes normal and sometimes altogether destitute of cells.

### Family Bicellariidæ.

#### DIACHORIS, Busk.

*Diachoris bilaminata*, n. sp.

(Pl. VIII. figs. 7, 7 a).

*Zoarium* (probably) erect, composed of two layers of cells placed back to back; connecting tubes six, very short. *Zoæcia* large, elongate, boat-shaped, suberect, placed close together and overlapping considerably; margin running out into a short spinous process on each side of the orifice; aperture occupying the whole front; orifice terminal; oral valve arched above, with a straight lower margin; at a short distance below the top on one side an articulated avicularium (often wanting), slender, rather compressed, the beak long and flat above, bent slightly and abruptly at the extremity; mandible very slender and sharply pointed. *Oæcia* (?).

*Loc.* New Zealand (*Miss Jelly*).

This diagnosis is founded on a fragment; and I can therefore give no account of the size or mode of growth. The zoæcia have a strongly marked character, and differ widely from those of any form with which I am acquainted. The layers are closely united, and constitute a very compact bilaminated zoarium. A striking point is the degree in which the zoæcia overlap one another, each cell originating a good way down on the dorsal surface of the one below it.

The affinity between *Diachoris* and *Beania* and *Bugula* is of the closest kind; between the present genus and the last named there is indeed but a single point of difference that is at all constant, the disjunct condition of the cells; and this can hardly be regarded as specially significant\*.

The following species of *Diachoris* have been described:—*D. Crotali*, Busk, Bass's Straits; *D. magellanica*, Busk (= *D.*

\* I quite agree with Mr. Waters that "the genus *Diachoris* can only be looked upon as a provisional one" ("Bryozoa of Bay of Naples," 'Annals,' Feb. 1879, p. 120).

*Buskei*, Heller), Straits of Magellan, New Zealand, Mediterranean; *D. inermis*, Busk, New Zealand, Straits of Magellan; *D. costata*, Busk, Kerguelen Island, Australia; *D. spinigera*, Australia; *D. hirtissima*, Heller (= *Chaunosia hirtissima*, Busk), Adriatic, Cape of Good Hope; *D. armata*, Heller, Adriatic; *D. patellaria*, Moll (= *D. simplex*, Heller, and *Mollia patellaria*, Smitt—generically distinct), Adriatic; *D. Buskiana*, Hutton, New Zealand.

Family **Myriozoidæ** (part), Smitt.

SCHIZOPORELLA, Hincks.

*Schizoporella argentea*, n. sp.

(Pl. IX. figs. 6, 6 a.)

*Zoæcia* ovate, irregularly disposed, convex, strongly sutured, separated by inconspicuous lines, very distinctly and beautifully granulated over the entire surface, punctured round the margin, greyish white, lustrous; orifice suborbicular, produced below into a pointed sinus; peristome not raised; along one side of it a large mound-like elevation, rising to a point above, on the inner face of which is an erect *avicularium*, with acute mandible directed upwards; on the opposite side, just beyond the sinus, a short spinous process; on the upper margin two or three spines; in many cases the oral *avicularium*, instead of being erect and close upon the margin, is turned downwards and outwards, is much elongated, and stretches down about half the length of the cell. *Oæcia* rounded, thickly granulated and punctured. *Zoarium* of very delicate texture, greyish white, silvery.

*Loc.* Africa, on coral (*Miss Jelly*)

*Schizoporella linearis*, Hassall, form *quincuncialis*.

(Pl. IX. fig. 3.)

*Zoæcia* ovate, occasionally lozenge-shaped, moderately convex, separated by lines, quincuncially arranged; surface bright and silvery, thickly punctured; orifice suborbicular, with a shallow pointed sinus on the lower margin, a ridge-like callosity placed longitudinally immediately below the sinus; at each side of the orifice, usually almost close to the top of the cell, a mound-like rising, bearing a small *avicularium*; mandible acute, generally directed upwards. *Oæcium* (?).

*Loc.* Ceylon (*Miss Jelly*).

In general appearance this variety is very unlike the well-known *S. linearis*. Its *zoæcia* exhibit none of the depression of surface and definite linear arrangement which are so characteristic of the normal form; they are ovate, convex,

and quincuncially disposed. But, on the other hand, the zoecium agrees with that of the normal form in the form of the orifice, and in having a small, raised, and pointed avicularium on each side of it. These appendages, indeed, are placed somewhat higher up than is usual (more so, indeed, than is shown in my figure); but in this species there is so much variability in their position that this cannot be regarded as a character of any importance. The present form must, I think, be ranked as one more modification of the *linearis* type. I have figured another specimen of this species (Plate IX. fig. 2), which illustrates still further the variability in the position of the avicularia.

### Family Escharidæ (part), Smitt.

#### SMITTIA, Hincks.

##### *Smittia nitida*, Verrill.

(Pl. IX. figs. 5, 5 a.)

*Zoæcia* subquadrangular (very irregular in shape), disposed in linear series, separated by raised lines, slightly convex, areolated round the margin, or simply punctured, the surface very bright and lustrous, of a delicate white colour, covered with large polished granules; orifice suborbicular, somewhat flattened below; the peristome raised above and (especially) at the sides, where it rises into prominent points, not elevated in front; on the lower margin three denticles, two lateral and small, and one larger in the centre; on each side of the orifice (or on one side only) a subspatulate *avicularium* (narrow at top, and expanding towards the extremity) raised on a small mound; sometimes replaced by a gigantic curved avicularium, stretching down two thirds of the length of the cell. *Oœcium* rounded, thickly punctured in front, often invested round the base by a thick granular band; usually an avicularium with pointed mandible at the back; peristome continued as an arch across the front of the oœcium.

*Loc.* North America (*Verrill*); Africa, on coral (*Miss Jelly*).

Drawings of this species were prepared before I was aware that it had been figured by Prof. Verrill from North-American specimens. I have engraved them, as they show a remarkable modification of the avicularium not noticed by Verrill.

A detailed diagnosis has been added, no description accompanying his figure.

#### ASPIDOSTOMA, n. gen.

*Gen. char.*—*Zoæcia* with a calcareous front wall, destitute of raised margins; orifice arched above, straight below, pro-



tected in front by a broad shield-like plate, which is continued downwards for some distance within the cell; attached to the inner surface of the plate, on a level with the margin of the orifice, a semicircular membrano-calcareous (?) frame, into which the oral valve fits; wall of the cell elevated behind the orifice into a broad hood-like expansion, which covers it in and forms an arched secondary orifice. *Zoarium* (in the only known species) erect and bilaminate.

*Aspidostoma crassum*, n. sp.

(Pl. X. figs. 6, 6 a.)

*Zoarium* erect, compressed, thick, contracted towards the base, and widening upwards, of a reddish-brown colour. *Zoœcia* disposed in two layers, placed back to back, massive and thick-walled, quincuncial, very broad and rounded above, narrowing off downwards (pyriform), truncate at the bottom, divided by very deep sutures; surface dense, roughened; back of the cell elevated and forming a hood over the orifice, with an arched opening in front, the margin of the hood rising into two prominent pointed processes, between which there is a narrow cleft; orifice arched above, straight below, screened by a broad plate, with a thickened and everted edge, which conceals it and stretches across a great part of the arched opening; margin of the plate continuous with the wall of the hood, and forming with it on each side a loop-shaped opening; front of the cell somewhat flattened below the orifice and sloping down towards it; in the centre of this portion a raised elongate callosity; leaning against the side of many of the cells, a little below the upper extremity, an *avicularium*, with a very short, broad, subtriangular mandible directed upwards. *Oœcium* elongate, much depressed, shield-like, granulated.

*Loc.* Dredged between Patagonia and the Falkland Islands (*Capt. Cawne Warren*).

This very curious form is remarkable for the thickness and solidity of the zoarium and the massive character of the zoœcia. Young cells are less strongly calcified, and the hood is of much more slender make than in the adult, and does not project so far in advance of the orifice. It is always at this stage destitute of the marginal processes which give so peculiar a character to the adult zoarium\*. In the old cells calcification is carried to a great extent, the upper extremity becomes very tumid, and the wall rises down the sides into a kind of mound, which partially closes in the depressed area below the mouth. The curious structure of the orifice will

\* The figures do not show the very prominent and striking character of the hood, and its two marginal processes.

be best understood by referring to the figure. The lamina or plate which protects it is hollowed out in front. This plate passes down for a considerable distance into the interior of the cell; immediately within it is placed the semicircular frame on which the oral valve works, which fits close on to the inner surface of the lamina. The flattened, shield-like ovicell is another striking feature.

The structure of the zoecium in this species is so remarkable that I cannot hesitate to refer it to a new genus. Busk, in his 'Catalogue,' describes an *Eschara* (*E. gigantea*), from South Patagonia, which bears some slight general resemblance to the present species; but neither the diagnosis nor the figure represents the essential peculiarities of *A. crassum*.

## EXPLANATION OF THE PLATES.

### PLATE VIII.

- Fig. 1. Membranipora cervicornis*, MacGillivray, to show the structure of the zoecium. The forked spines omitted, except in the case of a single cell, and only the fixed tubular base represented.
- Fig. 2. Membranipora (Caleschara) denticulata*, MacGillivray. In this figure the membranous wall, which closes in the entire front of the cell, is omitted, so as to display the calcareous lamina and the offset from its upper margin, which together form an inner covering over a considerable portion of the area. The semicircular oral valve at the top of the area must be understood to belong to the absent membranous front wall.
- Fig. 3. Membranipora setigera*, n. sp.
- Fig. 4. Membranipora bellula* (normal form), n. sp. 4 a. Ditto, var. *bicornis*. 4 b. Ditto, var. *multicornis*.
- Fig. 5. Membranipora terrifica*, n. sp.
- Fig. 6. Membranipora rubida*, n. sp.
- Fig. 7. Diachoris bilaminata*, n. sp. 7 a. Zoecium with avicularium.

### PLATE IX.

- Fig. 1. Membranipora bicolor*, n. sp.
- Fig. 2. Schizoporella linearis*, Hassall. Variety with avicularia at the top of the cell and on each side of the oecium.
- Fig. 3. Schizoporella linearis*, var. *quincuncialis*.
- Fig. 4. Membranipora patula*, n. sp.
- Fig. 5. Smittia nitida*, Verrill. [This figure represents a very irregular group of cells.] 5 a. Zoecium with ovicell.
- Fig. 6. Schizoporella argentea*, n. sp. 6 a. Single zoecium.

### PLATE X.

- Fig. 1. Membranipora coronata*, n. sp.
- Fig. 2. Membranipora permunita*, n. sp.
- Fig. 3. Membranipora cervicornis*, MacGillivray, var. 3 a. Oecium.
- Fig. 4. Vincularia abyssicola*, Smitt. From an incrusting colony.
- Fig. 5. Epicaulidium pulchrum*, n. sp. 5 a. A single triplet of cells.
- Fig. 6. Aspidostoma crassum*, n. sp. Showing a group of cells from the younger and older portions of the colony. 6 a. Fragment of the zoarium, nat. size.